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RESEARCH AND FIELD LABORATORIES FOR WATER POLLUTION CONTROL

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RESEARCH and FIELD LABORATORIES

for Water Pollution Control

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service

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RESEARCH and FIELD LABORATORIES

for Water Pollution Control

College, Alaska
Athens, Georgia
Boston, Massachusetts
Ann Arbor, Michigan
*Mid Atlantic**
Ada, Oklahoma
Corvallis, Oregon

Duluth, Minnesota
Kingston, Rhode Island

*Location to be announced

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Water Supply and Pollution Control
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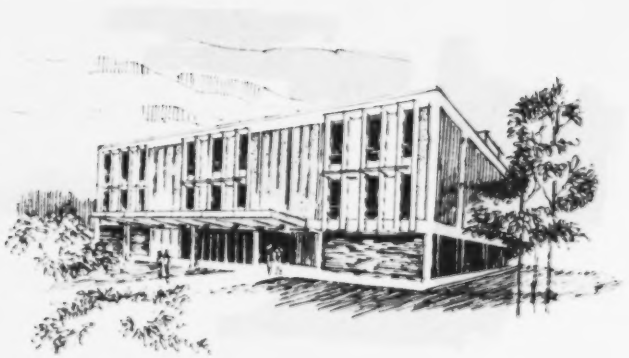
II



IN THE NEXT FEW YEARS, nine new laboratories will be built at strategic points throughout the United States as part of the Federal Government's water pollution control program. Seven of these will be devoted to regional water problems, and two will be assigned the special task of developing national water quality standards.

In authorizing these laboratories, Congress has recognized both the importance of water pollution control and the need for a greatly expanded research effort in this field. At the present time, there is not enough scientific knowledge to cope with the critical problems which will be encountered in the future as our population, industry and agriculture continue to grow. Indeed, many of these problems are with us right now.

The fact is that our Nation is demanding more and more water, while at the same time producing more and more waterborne wastes. Many of these are new and baffling wastes of synthetic origin, encountered nowhere in nature. All this will require the development of more effective ways of keeping water clean so that it may be used over and over again. This is necessary not only for economic reasons but for the protection of public health and the preservation of a great recreation and aquatic life resource.

The new laboratories will be a much-needed supplement to programs already being carried on by the Public Health Service. These include intramural research, now based in the Robert A. Taft Sanitary Engineering Center in Cincinnati, and extramural research carried on by means of financial support to universities and other research institutions.

In both of these avenues, the Public Health Service directs its work to all water uses—water for the protection of health, for the needs of industry and agriculture, and for the requirements of a good fish and wildlife habitat. Both kinds of research also involve a large number of scientific disciplines, including many in the chemical, physical and biological sciences as well as the social sciences.

These patterns will be followed when the first of the new laboratories comes into operation in 1965. The laboratories will also emphasize a third element, regional orientation. Water pollution control poses different problems in one part of the country than in another. In the

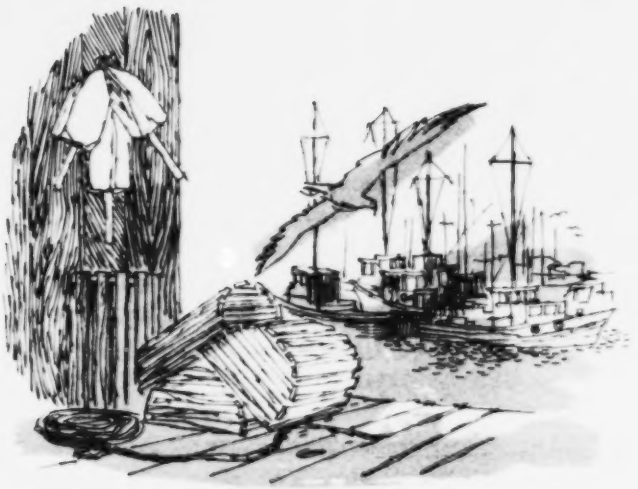
new laboratories, scientists and engineers will be able to study these regional problems at firsthand.

In both the regional and the special purpose laboratories, emphasis will be placed on cooperative work and interchange of information with universities in the region, with other research institutions, and with private industries and other government agencies. Among the latter are other Federal agencies, State and interstate agencies, and municipalities.

The authorization for the new laboratories as stated in the Federal Water Pollution Control Act (Section 2(e), Public Law 660 as amended), provides that:

> "The Secretary [of Health, Education, and Welfare] shall establish, equip, and maintain field laboratories and research facilities, including, but not limited to, one to be located in the northeastern area of the United States, one in the Middle Atlantic area, one in the southeastern area, one in the midwestern area, one in the southwestern area, one in the Pacific Northwest, and one in the State of Alaska, for the conduct of research, investigations, experiments, field demonstrations and studies, and training relating to the prevention and control of water pollution. Insofar as practicable, each such facility shall be located near institutions of higher learning in which graduate training in such research might be carried out."

Each of these new research facilities will cost, fully equipped, somewhat more than $2 million and, with the exception of Alaska, their staffs will number from 130 to 150. About two-thirds of the staffs will be the scientists and other professionals.



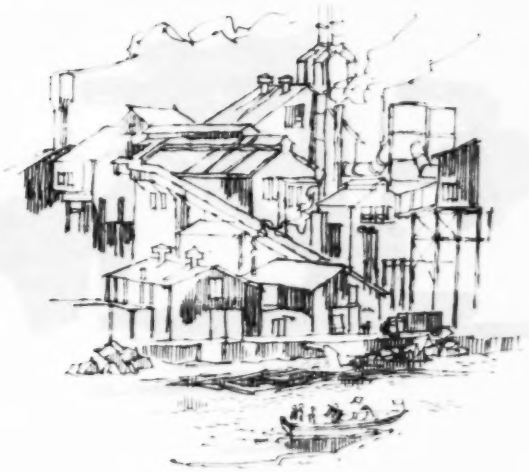
BOSTON, MASSACHUSETTS

The Northeast laboratory, to be located in the Jamaica Plain section of Boston adjacent to the laboratories of the Massachusetts Department of Public Health, will serve New England and New York State, an area with a wide diversity of water resources, uses and pollution problems. The area's major river systems—the Connecticut, St. Lawrence, Hudson, Susquehanna, Merrimack, Kennebec and Penobscot—are supplemented by waters of the eastern Great Lakes, the Finger Lakes, Lake Champlain and the New York State Barge Canal. In addition, of course, there is the long and irregular Atlantic coast with its numerous harbors and bays, shared by six of the seven States of this region.

In New England, pollution is largely industrial in origin. Large textile plants are located in Rhode Island and parts of Massachusetts. The metal industry, with many types of plants producing a wide variety of products, is concentrated in these two States and Connecticut. Chemical manufacturing, one of the largest industries in Massachusetts, produces plastics, fertilizers, dyes, paints, insecticides and industrial gases. Paper making is important in various areas, primarily along the Kennebec, Penobscot and Androscoggin Rivers in Maine. Also of economic importance are leather and rubber manufacturing, food canning and the dairy industry. Oil spillage from ships has long been a serious problem all along the New England coast.

New York State faces complex pollution problems in the commercial and recreational uses of both the Great Lakes and Finger Lakes. In other sections, Long Island has serious ground water supply and pollution problems; heat pollution and water diversion difficulties affect the hydro-electric power industry in the Hudson Valley; canning and food processing in the Rochester-Buffalo and the Mohawk areas, and the grape industry in central and western New York pose their own peculiar problems. All these industries use large quantities of high quality water—and all are sources of pollution.

The Boston laboratory will undertake cooperative research with industry, and will take advantage of the convenient educational and research complexes centered in the Boston and New York areas.



MID ATLANTIC

Widely diverse pollution problems plague the Middle Atlantic area, ranging from industrial wastes to acid mine drainage, from siltation to sewage pollution of coastal fishing and shellfish waters. Here too there are metal plants, textile factories, oil refineries, big scale poultry processing, truck farming and many other industries which require much water and produce waterborne wastes.

• The Middle Atlantic drainage basins include the Delaware, Susquehanna, Potomac and Upper Chesapeake Bay to the southern boundary of Maryland, and many small coastal streams in Delaware, New Jersey and Maryland. The Mid Atlantic laboratory, whose site is yet to be selected, will cover all or part of Pennsylvania, Delaware, New Jersey, Maryland, Virginia, West Virginia and the District of Columbia.

The entire Mid Atlantic coastal area is expected to become industrialized, thus exerting great pressures on water supply for domestic, recreational and industrial uses.

Among special pollution problems of this region requiring research and field study are: (1) the addition of nutrients by the discharge of sewage to coastal waters, which may cause increased growth of algae (even the treated sewage effluents are troublesome in this respect); (2) acid mine drainage, a pollutant causing great concern in Pennsylvania and West Virginia because it destroys the usefulness of waters and kills aquatic life; (3) effects of pollution from industrial, domestic and shipping wastes on fish, shellfish and other aquatic life along the coast and in tidal waters; (4) economical methods to disperse waste discharges in coastal waters; (5) effects of waste waters with significant heat content—as a result of increased demand for electric power and expansion of industries requiring cooling waters; (6) increasingly complex agricultural problems resulting from the widespread use of insecticides, herbicides and other chemicals which have caused serious stream damage and fish kills in many farm area watersheds.

ATHENS, GEORGIA

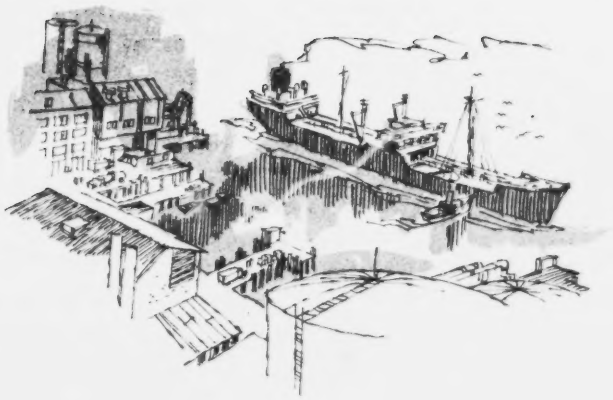
Water has always been basic to the South's agricultural economy, and it now plays a key role in the region's industrial and technological advance. Soil erosion is a major pollution problem, and other types of pollution have become acute as urban populations increase and industry expands.

The laboratory on the campus of the University of Georgia will cover the Southeast Drainage Basins, including all the river systems discharging into the Atlantic Ocean or the Gulf of Mexico from the Rappahannock River in Vir-

ginia to the Pearl River in Mississippi. The area includes all or parts of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama and Mississippi.

Two basic problems of water supply and quality management will receive major attention in the Athens laboratory: (1) an increasing use of pesticides and other farm chemicals, which are affecting water quality throughout the South; and (2) wastes from the growing industrial complex in the South, particularly in the textile and paper fields. In Florida, tourism and water recreation loom large in the State's economy; at the same time this State is experiencing one of the Nation's most rapid growths in permanent population and housing development. There are many pollution problems accruing from hastily installed septic tank disposal systems, from dredging of inlets to provide manmade acres for housing, and from sea water encroachment into the fresh water aquifer.

Pesticide pollution studies are already underway in western South Carolina as well as in North Carolina, Florida, and Alabama. Other important industries in the area which have added to the industrial waste problem include food processing, chemicals, rubber, petroleum and coal. Commercial fisheries of the Atlantic and Gulf Coasts are of economic importance and have been threatened by pollution of coastal waters. A promising newer potential for growth is the recreational facilities afforded by rivers, lakes and beaches in the Southeast, but the unlimited possibilities for such expansion will depend on safeguarding the waters against pollution.



ANN ARBOR, MICHIGAN

The Midwest laboratory will be situated on the campus of the University of Michigan and will serve all or parts of 21 States in the Ohio, Upper Mississippi, Western Great Lakes and Missouri drainage basins.

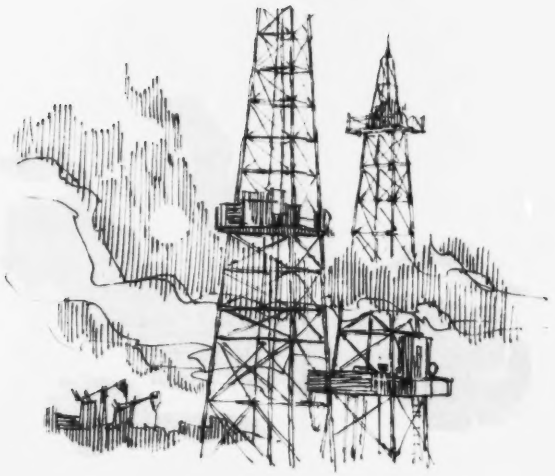
"Water Wonderland" and "Land of Ten Thousand Lakes" are among the popular slogans of Midwestern States, indicating their pride in their vast fresh water resources. But this same area is confronted with some of the country's most pressing problems in water quality management.

Intensive industrialization and population concentra-

tion—the area contains more than 60 million people—have multiplied the problems of waste treatment and disposal. Water reuse is common throughout the Missouri-Mississippi-Ohio Basin and poses special problems of pollution control and waste separation. Ground water pollution has become acute in some of the metropolitan-suburban complexes not yet adequately sewered and serviced by public water supply systems.

Management of lake waters provides another critical problem, particularly for cities which depend upon this source for both water supply and waste disposal. Dairy products, lumbering, meat-packing, paper manufacture, steel production, iron ore, agriculture—all these loom large in the economy of the Midwest. There are problems in waste disposal and water pollution connected with each—problems with which the Ann Arbor laboratory is likely to be concerned.

Research at the Ann Arbor laboratory will be coordinated with the water resource studies which are now going on in many midwestern universities, as well as with the State and interstate water agencies in the region. Close working relations already have been developed with the Committee on Institutional Cooperation, representing the Big Ten Universities and the University of Chicago. An interinstitutional committee has been established to work with laboratory personnel. The Ann Arbor work will also benefit from Public Health Service studies already in progress as part of the Great Lakes comprehensive study for water quality management, headquartered in Chicago.



ADA, OKLAHOMA

The Southwest is a region of traditionally short water supply. Today, an expanding population and more diverse industry compete with increasing pressure for recreational use of waters and large demands by agriculture. The Ada, Oklahoma, laboratory to be located on the new south campus of Oklahoma's East Central State College will provide research and other services for all of the States of Arkansas, Louisiana, Texas, Oklahoma, New Mexico and Arizona; parts of Colorado, Mississippi, Tennessee, Missouri and Kansas; and for Nevada and California to the degree

necessary and appropriate for planning and other program activities.

Each use of the Southwest's waters contributes towards their contamination. Among the fields of research to be studied at the Ada laboratory will be management of water quality in storage reservoirs and the release of such waters for streamflow regulation and waste dilution; prevention of salt and dissolved solids from both natural and industrial sources as well as from irrigation return flow to streams; and pollution from regional industries and mining. Radioactive wastes from uranium mining in some of the southwestern States have been under Public Health Service surveillance for some time, and methods for their safe and permanent disposal are still under test.

The Public Health Service recently completed a special five-year study to discover where the salt in the Arkansas and Red Rivers comes from. The study has established a broad base of scientific knowledge for controlling this pollutant and finding effective ways to use these now largely unusable sources of water. This will be a subject for additional investigation when the Ada laboratory opens.

When completed in 1965, the laboratory also will work closely with other water agencies and universities in the Southwest. The Public Health Service now supports eight water research projects at the Universities of Texas and Arkansas, at Baylor and Tulane, at Oklahoma State University, and the Lubbock, Texas, Health Department, with grants totaling more than $135,000.

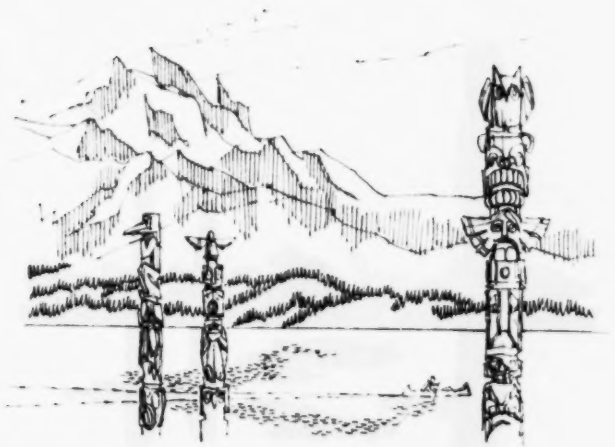
CORVALLIS, OREGON

The Pacific Northwest, where water is a most important natural resource, has not yet experienced the extensive water pollution problems of the East and Midwest. The principal need in this region is to develop and increase water supply to meet the demands of a growing economy by conserving the generally excellent condition of the water.

The laboratory for this region will be located on the main campus of Oregon State University in Corvallis,

where the Public Health Service since 1953 has sponsored an aquatic biology research program. The new facility will serve all of Oregon, Washington, Montana, Idaho, Wyoming and Utah, plus Nevada and California to the degree necessary and appropriate for planning and other program activities.

Water quality in both coastal and inland fresh waters in the Northwest is already affected to some extent and problems will be intensified by the utilization of timber resources, roadbuilding, hydro-power and other water resource development, irrigated agriculture, food processing and mining and mineral operations. Research subjects for the Corvallis laboratory will include: (1) precise definition of waste characteristics from pulp and paper production and timber processing in terms of identity, effect, means of detection, and principles for pollution prevention; (2) changes in water quality and thermal stratification in the regions multipurpose water impoundments; (3) the effect of silt deposits on removing pesticides in solution; (4) evaluation of stream damage from dredge and placer mining operations; (5) quick, unequivocal means of detecting damaging water quality changes, and developing water quality criteria for organisms of commercial and recreational importance to preserve the fishing and shellfishing industries; (6) more effective and economical municipal waste treatment and improved means of handling industrial wastes; (7) ground water pollution and recharge; (8) natural and induced fertility in relation to production of nuisance algae.



COLLEGE, ALASKA

Because of its Arctic environment, Alaska's water problems are vastly different from those elsewhere in the United States. Although there are 26,600 miles of coastline and thousands of lakes and streams, usable water supply is limited and many of the streams have wide fluctuations in flow.

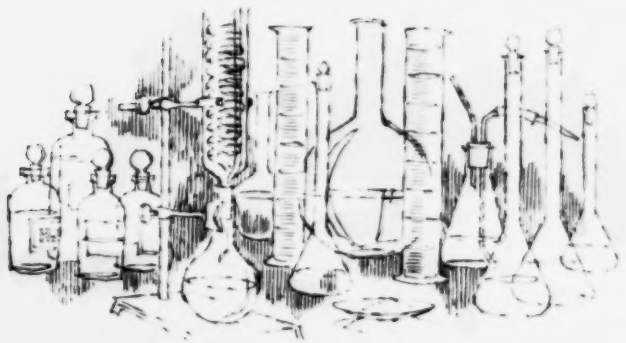
The laboratory to be located on the University of Alaska campus will undertake a more basic program than

those elsewhere. It will be concerned primarily with demonstration projects in the field of water supply, waste collection and waste disposal. A staff of 62 will utilize individuals with multifunctional skills and training to back up particular projects by outside consultants.

Research projects will be oriented toward problems peculiar to the Arctic area, a region presenting a large and varied array of problems of sanitary significance. Some of the more important are: (1) establishing base lines of quality for developing water use with emphasis on waterways most vital to Alaska's economic growth; (2) research to provide the basis for maximum water use, including studies of carbon and nitrogen cycles under temperature extremes, and effects of sunlight and low temperatures on aquatic fauna and flora; (3) studies on preserving water quality for the fishing industry, the mainstay of Alaska's economy, by finding a rapid means of detecting damaging water quality changes and developing criteria for organisms of commercial importance; (4) effects of the pulp mill industry on water quality; (5) study of damaging effects of dredge and placer mining operations and evaluation of controls needed; (6) study of low temperature influences on conventional primary and secondary waste treatment processes, and effectiveness of waste stabilization ponds for municipal and industial wastes in the Arctic; (7) developing criteria for desirable aquatic life under cold weather conditions in connection with water quality control.

Increasing tourism will make the esthetic value of clean water doubly important in the State's economy.

Laboratories for Water Quality Standards



KINGSTON, RHODE ISLAND

DULUTH, MINNESOTA

How "clean" is clean water? What must be the physical, chemical and other characteristics of water, if the water is to be used for human consumption, for irrigating croplands, or for industry, or as a habitat for fish? In 1962, Congress appropriated $1 million for the establishment of two specialized national laboratories to answer these and other questions about water quality standards.

Realistic water quality standards, based on scientific investigations, are a vital necessity in safeguarding water resources. They permit a water pollution control administrator to establish rules concerning the treatment of wastes and their discharge into waterways. They help in the designing of effective treatment facilities and encourage necessary modifications in the management of a river when industrial or other changes take place.

The two new water quality standards laboratories will be located in Duluth, Minn., where studies will develop quality criteria for fresh water uses, and at Kingston, R.I., where the marine environment will be studied to develop comparable standards for salt water uses. These two establishments will carry on independent research and will also head up cooperative activities involving other research institutions, universities, and various public and private agencies.

In developing standards of water quality, attention will be paid to all the uses of water—the protection of aquatic life and wildlife, utilization by industry and agriculture, water for recreation and water for domestic and public drinking supplies. First priority will be given to determining standards for aquatic life; the country's steadily dwindling fishery resource is not only a serious commercial and recreational loss, but a warning signal of the dangers in the water which is used by humans for drinking, for food processing and for swimming.

Programs to establish water standards must include scientific research in many different fields. Important parts

of the Duluth and Kingston programs will cover:

1—The development of a reliable methodology to detect and identify water pollutants and to measure their effects on water uses.

2—Establishment of water quality requirements in lakes, rivers and oceans, and determination of the varying effects of sewage and industrial wastes.

3—Chemical and bioassay studies of wastes to determine their fate and toxicity in the fresh and salt water environments, particularly as they affect sport fish, shellfish and other aquatic organisms, so as to establish the tolerance levels of fish to specific pollutants.

4—An evaluation and continuing review and updating of all water quality standards previously accepted by governments and other agencies.

5—The retrieval and storage of pertinent research findings in water quality obtained from sources throughout the world.

The Duluth Laboratory will be located at the largest supply of fresh water in the Nation and the world—the Great Lakes. An added advantage is its close proximity to the Duluth campus of the University of Minnesota, where extensive studies are being conducted on the biology of streams and lakes, and to the Oliver Research Laboratory of the U.S. Steel Corporation, also in Duluth, and to Wisconsin State College in nearby Superior.

The Kingston marine waters laboratory will work closely with the Narragansett Marine Laboratory of the

University of Rhode Island, and in addition, each will supplement the research at the recently established Public Health Service Shellfish Laboratory, also at Kingston. The three scientific groups will complement each other, thus bringing about a very broad coverage of research on the water environment and its practical application.

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